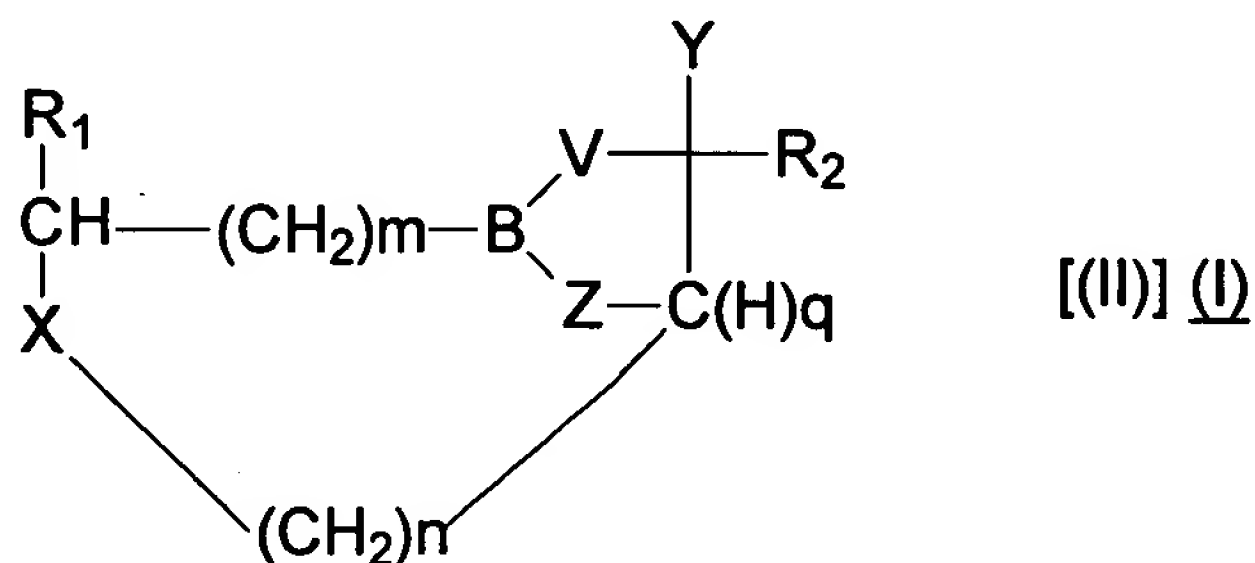


26. (Amended) A boron-containing of formula [II] I



wherein

R₁ and R₂ may be the same or different and each is a side chain of a naturally occurring amino acid, a [hydroxy] hydroxyl containing side chain of a naturally occurring amino acid wherein said [hydroxy] hydroxyl group may be glycosylated, phosphorylated, sulphonylated or protected by a [hydroxy] hydroxyl protecting group, a primary amino [amido] containing side chain of a naturally occurring amino acid wherein said amino group may be glycosylated or substituted by (C₂–C₄) alkyl, –CH₂CH(CO₂H)₂, –(CH₂)₂ S(O)CH₃, –(CH₂)₂ S(O)₂ CH₃, –(CH₂)₃ NH₂ or –(CH₂)₃ ONHC(=NH)NH₂;

V is O, CH₂ or NH;

X is hydrogen, oxygen, amino, amino protected by a protecting group selected from the group consisting of terminal amino protecting groups, amino bonded to the C terminus of a naturally occurring amino acid to form a peptide bond, and amino bonded to the C terminus of a peptide to form a peptide bond, [said amino acid and peptide being unprotected or protected by said protecting group, or X is] alkene, (C₁–C₉)alkyl, (C₁–C₉)alkoxy or phenyl, phenoxy, cyclohexyl, phenylthio, phenylsulfinyl [or] and phenylsulfonyl, wherein the aforementioned

phenyl groups may be unsubstituted or mono-, di- or trisubstituted by halogen, (C₁-C₄)alkoxy or (C₁-C₄)alkoxycarbonyl;

B1
Y is hydrogen, carboxyl, carboxyl protected by a protecting group selected from the group consisting of terminal carboxyl protecting groups, a carbonyl bonded the N terminus of a naturally occurring amino acid to form a carbonyl bonded to the N terminus of a peptide to form a peptide bond, [said amino acid and peptide being protected or unprotected by said protecting group, or Y is] (C₁-C₉)alkyl, (C₁-C₉)alkoxy, or phenyl phenoxy, cyclohexyl, phenylthio, phenylsulfinyl [or] and phenylsulfonyl, wherein the aforementioned phenyl groups may be unsubstituted or mono-, di- or trisubstituted by halogen, (C₁-C₄)alkyl, (C₁-C₄)alkoxy or (C₁-C₄)alkoxycarbonyl; and wherein

Z is O, CH₂ or NH;

m is 0 or an integer from 1 to 10;

n is 0 or 1; and

q is 1 or 2 provided that if q is 2, then there is no bond between X and the carbon bond to Z.

29. (Amended) A hapten according to claim 26 wherein

R₁ is selected from the group consisting of CH₂OH and CH(OH)CH₃,

B2
R₂ is selected from the group consisting of CH(OH)CH₃ and CH₂ CONH₂,

X is selected from the group consisting of an amino group bonded to the C terminus of alanine, an amino group bonded to the C terminus of serine in the dipeptide Ala-Ser, an amino group bonded to the C terminus of threonine in the tripeptide Ala-

Ser-Thr₂ and an amino group bonded group to the C terminus of threonine in the polypeptide Ala-Ser-Thr-Thr₂ and

Y is selected from the group consisting of a carbonyl bonded to the N terminus of threonine in the polypeptide Thr-Thr-Asn-Tyr-Cys, a carbonyl bonded to the N terminus of threonine in the polypeptide Thr-Asn-Tyr-Cys, a carbonyl bonded to the N terminus of asparagine in the tripeptide Asn-Tyr-Cys, and a carbonyl bonded to the N terminus of tyrosine in the dipeptide Tyr-Cys.

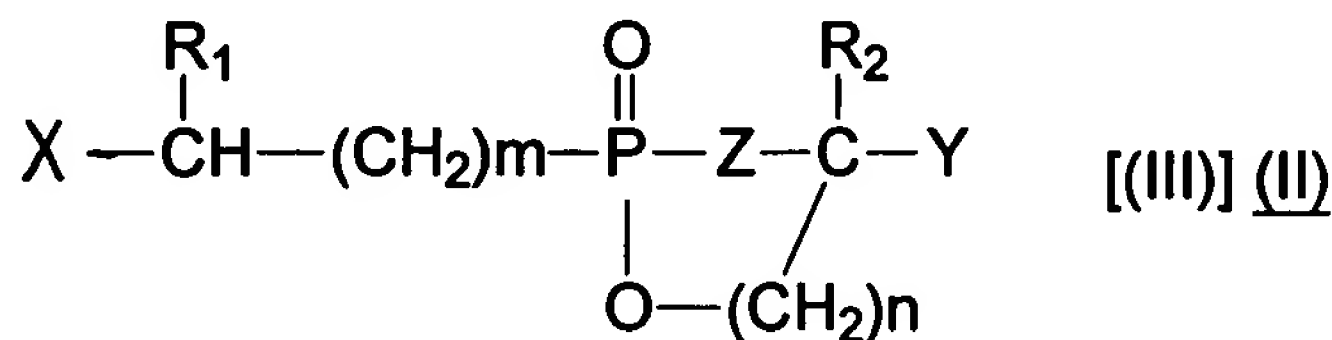
30. (Amended) A hapten according to claim 26 wherein R₁ is CH(OH)CH₃, R₂ is H, X is an amino group bonded to the C terminus of serine in the polypeptide Cys-Leu-Arg-Tyr-Ser and Y is a carbonyl bonded to the N terminus of threonine in the tripeptide Thr-Val-Cys.

32. (Amended) An immunogen capable of eliciting a catalytic antibody comprising:

(a) a hapten of formula [II] I as defined in claim 27; and

(b) a suitable carrier molecule.

33. (Amended) A phosphous containing hapten of formula [III] II



wherein

R₁ and R₂ may be the same or different and each is a side chain of a naturally occurring amino acid, a [hydroxy] hydroxyl containing side chain of a naturally occurring amino acid wherein said [hydroxy] hydroxyl group may be glycosylated, phosphorylated, sulphonylated or

protected by a [hydroxy] hydroxyl protecting group, a primary [amido] amine containing side chain of a naturally occurring amino acid wherein said [amido] amine group may be glycosylated or substituted by (C₁-C₄)alkyl, -CH₂CH(CO₂H)₂, -(CH₂)₂S(O)CH₃, -(CH₂)₂S(O)₂CH₃, -(CH₂)₃NH₂ or -(CH₂)₃ONHC(=NH)NH₂;

X is hydrogen, amino, amino group protected by a protecting group selected from the group consisting of terminal amino protecting groups, amino group bonded to the C terminus of a naturally occurring amino acid to form a peptide bond, and an amino group bonded to the C terminus of a peptide to form a peptide bond, [said amino acid and peptide being unprotected or protected by said protecting group, or X is] alkene, (C₁-C₉)alkyl, (C₁-C₉)alkoxy or phenyl, phenoxy, cyclohexyl, phenylthio, phenylsulfinyl [or] and phenylsulfonyl, wherein the aforementioned phenyl groups may be unsubstituted or mono-, di- or trisubstituted by halogen, (C₁-C₄)alkyl, (C₁-C₄)alkoxy or (C₁-C₄)alkoxycarbonyl;

Y is hydrogen, carboxyl, carboxyl protected by a protecting group selected from the group consisting of terminal carboxyl protecting groups, a carbonyl bonded to the N terminus of a naturally occurring amino acid to form a peptide bond, and carbonyl bonded to the N terminus of a peptide to form a peptide bond, [said amino acid and peptide being protected or unprotected by said protecting group, or Y is] (C₁-C₉)alkyl, (C₁-C₉)alkoxy or phenyl, phenoxy, cyclohexyl, phenylthio, phenylsulfinyl [or] and phenylsulfonyl, wherein the aforementioned phenyl groups may be unsubstituted or mono-, di- or trisubstituted by halogen, (C₁-C₄)alkyl, (C₁-C₄)alkoxy or (C₁-C₄)alkoxycarbonyl;

Z is O or NH; and

m and n may be the same or different and each is 0 or an integer from 1 to 10.

(34) (Amended) An immunogen capable of eliciting a catalytic antibody comprising:

- B3
- (a) a hapten of formula [III] II as defined in claim 33; and
 - (b) a suitable carrier molecule.

39. (Amended) A catalytic antibody which [can catalyze] catalyzes a chemical reaction of interest and which is elicited through *in vitro* or *in vivo* techniques by an antigen comprising the hapten of claim 26, said catalytic antibody having been prepared by a process comprising the steps of:

- B4
sub
C3
- (a) exposing cells capable of producing antibodies to said antigen and thereby generating antibody producing cells;
 - (b) hybridizing said antibody producing cells with myeloma cells and thereby generating a plurality of hybridoma cells each producing monoclonal antibodies; and
 - (c) screening said plurality of monoclonal antibodies to identify a monoclonal antibody which catalyzes said chemical reaction of interest.

40. (Amended) A catalytic antibody which [can catalyze] catalyzes a chemical reaction of interest and which is elicited through *in vitro* or *in vivo* techniques by an antigen comprising the hapten of claim 33, said catalytic antibody having been prepared by a process comprising the steps of:

- (a) exposing cells capable of producing antibodies to said antigen and thereby generating antibody producing cells;
- (b) hybridizing said antibody producing cells with mecloma cells and thereby generating a plurality of hybridoma cells each producing monoclonal antibodies; and
- (c) screening said plurality of monoclonal antibodies to identify a monoclonal antibody which catalyzes said chemical reaction of interest.

42. (Amended) A method for producing catalytic antibodies which [can catalyze] catalyzes a chemical reaction of interest and which are elicited through *in vitro* or *in vivo* techniques by an antigen comprising the hapten of claim 26, wherein said method comprises the steps of:

- BS
sub
C4
- (a) exposing cells capable of producing antibodies to said antigen and thereby generating antibody producing cells;
 - (b) hybridizing said antibody producing cells with myeloma cells and thereby generating a plurality of hybridoma cells each producing monoclonal antibodies; and
 - (c) screening said plurality of monoclonal antibodies to identify a monoclonal antibody which catalyzes said chemical reaction of interest.

43. (Amended) A method for producing catalytic antibodies which [can catalyze] catalyzes a chemical reaction of interest and which are elicited through *in vitro* or *in vivo* techniques by an antigen comprising the hapten of claim 33, wherein said method comprises the steps of:

- (a) exposing cells capable of producing antibodies to said antigen and thereby generating antibody producing cells;
- (b) hybridizing said antibody producing cells with myeloma cells and thereby generating a plurality of hybridoma cells each producing monoclonal antibodies; and
- (c) screening said plurality of monoclonal antibodies to identify a monoclonal antibody which catalyzes said chemical reaction of interest.

48. (Amended) A method for catalyzing the cleavage or formation of a specific peptide linkage or an ester bond within a specific amino acid sequence of a molecule which comprises contacting said molecule with an effective amount of a catalytic antibody elicited with a hapten